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Proceedings of The Canadian Phytopathological Society

Nineteenth Session

June 23-26, 1952

OTTAWA
ONT.

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Editorial Committee
RUTH M. HORNER
M. F. WELSH
G. W. AYERS
A. J. SKOLKO

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The Canadian Phytopathological Society

LIST OF OFFICERS AND COUNCIL
1951-52

President

G. H. BERKELEY, Laboratory of Plant Pathology, St. Catharines, Ont.

Vice-President

J. C. PERRAULT, Laboratory of Plant Pathology, Ste. Anne de la Pocatiere, Que.

Secretary-Treasurer

A. J. SKOLKO, Division of Botany and Plant Pathology, Science Service, Ottawa, Ont.

Councillors

W. NEWTON, Laboratory of Plant Pathology, Saanichton, B.C.
W. F. HANNA, Laboratory of Plant Pathology, Winnipeg, Man.

Copies of the Proceedings of the Canadian Phytopathological Society may be obtained from the Secretary-Treasurer at a price of 50c each.

Front Row : L. to R. — F. L. Drayton, W. Newton, A. J. Skolko, G. H. Berkeley, J. C. Perrault, R. J. Baylis, T. Johnson, I. L. Conners, Ruth M. Horner, Ruth Macrae.
Second Row : J. A. Parmelee, J. W. Groves, A. A. Hildebrand, J. K. Richardson, W. A. Hodgson, H. M. Good, L. T. Richardson, W. D. MacClement, J. J. Miller.
Third Row : D. A. Quirke, W. G. Kemp, K. M. Graham, G. C. Chamberlain, B. J. Sallans, W. L. Gordon, H. N. Racicot, M. W. Cormack, H. R. McLarty, A. N. Langford, R. R. Hurst, S. H. Z. Naqvi, C. D. McKeen.

Annual Meeting, C.P.S., Ottawa, Ont., June 23-26, 1952.

Otto Appel
1867 - 1952

Geheimrat Prof. Dr. Otto Appel, the Nestor of German plant pathologists and an honorary member of the Canadian Ptytopathological Society, died on November 11th, 1952, at his home in Berlin-Lablaudorf, Germany, in his 86th year.

Otto Appel was born on May 19th, 1867, in Coburg, Germany. From earliest childhood he was interested in botany. A large herbarium bears testimony to this early interest, a herbarium which still exists, as far as I know, in the museum of his home town. After completing his school work at Coburg he selected for his academic studies pharmacology, the then one and only "applied" phase of botany in which he was primarily interested. He studied at Breslau and at Wurzburg under the famous Professor Sachs where he graduated in 1897, his doctor's thesis being "Photo and Zoomorphosen". He then held a position as scientific assistant at the Institute of Hygiene and Bacteriology at Wurzburg. He followed his great interest in applied botany and became assistant at the Agricultural Institute of the University of East Prussia (Königsberg). In 1899 he entered the Biological Division of the Imperial Ministry of Health where he became intimately acquainted with von Tubeuf, who possibly largely stimulated Appel's interest in plant pathology. Promotion followed promotion until in 1920 he succeeded Professor Behrens as director of what had now become the "Imperial Biol. Reichsanstalt". Appel was a most prolific writer and his papers were numerous. It is of interest to note that nearly all his publications followed one principal direction, the prevention of diseases and pests and the development of immunity or at least resistance of crop plants to disease. He devoted much time to a study of certification based upon a thorough knowledge of the diseases of potatoes, which he was of the opinion could best be eliminated by seed treatment, selection, and certification. I remember well his interst in the Canadian practice of potato seed certification, which had then been practised in Eastern Canada at least for some time. As director at Dahlem Station he laid the foundation to a German plant disease protective law. He was keenly interested in studying the Canadian and U.S.A. Plant Disease and Insect Pests Acts, which he used as a basis but which, for reasons not known to me, became a most complicated conglomerate of state laws.

The first war, followed by the period of fantastic inflation, then the disastrous calamity of Hitler's regime, made progress of the Reichsanstalt (which had now dropped the Imperial epithet) very hazardous. However, Appel and a greatly reduced staff weathered the storm. Shortly after, Appel resigned from his position and went into "retirement", to him a period of catching up on matters postponed for many years. Universities of many countries honoured him, many were the honours bestowed upon him. His publications were many, his books numerous and at long last this industrious and illustrious leader in German plant pathology, after celebrating his 85th birthday, closed his eyes for ever. "I am now looking forward to my 90th birthday" he wrote me not so long ago.

H. T. GÜSSOW.

Edgar Thornton Reeder
1917-1952

Edgar Thornton Reeder was born in 1917 in Arcola, Sask., where he received his early education. In 1940 he joined the R.C.A.F. and served as an aero-engine mechanic in the United Kingdom and Europe until his discharge in October, 1945. He then completed his matriculation requirements and entered the College of Agriculture at the University of Saskatchewan where he specialized in Biology and was graduated with distinction in 1950. A year's graduate work under the direction of Professor T. C. Vanterpool culminated in the presentation of a Master's thesis on the "Taxonomy and Pathogenicity of some Phoma species found in flax". In the fall of 1951 he joined the staff of the Department of Botany, Ontario Agricultural College, where he was made responsible for research in the pathology of cereals and forage crops.

While devoting most of his attention to the broad field of plant pathology, Mr. Reeder had very strong interests in natural history and music. He was en enthusiastic worker and a co-operative associate, and will be lastingly mourned by his colleagues and friends.

Mr. Reeder is survived by his wife, Gladys Evelyn Reeder; his father, Mr. F. T. Reeder of Duncan, B.C.; a sister, Mrs. L. Hewitt of Arcola, Sask., and two brothers, James of Arcola, and Charles of London, Ontario.

To them, the members of the Canadian Phytopathological Society tended a deep and understanding sympathy in their bereavement.

B. H. MacNEILL.

MINUTES OF THE NINETEENTH MEETING HELD AT OTTAWA, ONTARIO, JUNE 23 TO 26, 1952.

Business Sessions: June 24 and June 26.

The first business session of the 19th meeting was convened in the Chateau Laurier, Ottawa, on June 24. The president declared the meeting opened and reviewed the progress made by the Society in the past year. As a result of a suggestion made early in the year, intended to stimulate activity within the regional groups, namely, that the regional groups take an active interest in the matter of terminology and report their discussions to the Terminology Committee, and recruitment of new members within the groups, the president reported considerable success had been achieved. The president suggested that the regional groups continue to devote part of their program to subjects of interest to the membership as determined by Council and that regional representatives prepare reports on the year's activities to be presented at the annual meeting.

As the minutes of the 18th meeting of the Society had been distributed to the members in January, their adoption was moved by H. R. McLarty and seconded by W. C. Broadfoot without reading. Carried.

The report of the Secretary-Treasurer was presented and adopted on motion of A. J. Skolko, seconded by I. L. Conners.

Dr. T. Johnson presented the report of the Custodian of the Library and Records which was adopted on his motion, seconded by L. T. Richardson. It was suggested that a complete set of reprints of papers issued by the Division of Botany and Plant Pathology be secured for the library of the Society.

The following standing committee reports were presented, duly moved, seconded, and carried:

Editorial—moved by J. W. Groves, seconded by R. S. Willison.
Nominating—moved by W. Newton, seconded by W. C. Broadfoot.
Terminology—moved by J. J. Miller, seconded by R. S. Willison.
Disease Diagnosis—moved by W. Newton, seconded by J. C. Perrault.
Nomenclature—moved by W. L. Gordon, seconded by J. J. Miller.

Reports of the committees are presented below. Mr. I. L. Conners gave a resumé of the activities of Canadian Society of Microbiologists and a report later received from A. R. Walker, representative to the C.S.M. is reproduced below. Mr. Conners moved the re-appointment of Dr. Walker as C.S.M. representative, seconded by A. N. Langford. Carried.

Election of members of the Nominating Committee returned the following: G. H. Berkley (Chairman) and W. Newton (two past presidents, by constitution), A. N. Langford, L. W. Koch, and H. N. Good.

The second business session was held on June 26 at which time the following applicants for membership were accepted: C. J. Anastasiou, Jane Atkinson, R. G. Atkinson, T. G. Atkinson, Joan D. Barton, W. G. Benedict, D. Brewer, J. Cockerill, E. F. Cole, D. W. Creelman, Henry T. Dirks, N. T. Englehardt, Shelagh Gibson, F. R. Harper, E. C. Hughes, Wm. G. Kemp, W. D. MacClement, N. Barbara Maxwell, Marion S. Moss, O. A. Olsen, A. K. Parker, J. A. Parmelee, W. A. Porter, Wm. B. Raymer, Jack W. Roff, A. G. Rudd, Robt. A. Shoemaker, A. E. Straby, H. S. Thompson, J. H. Tremaine, G. W. Wallis, M. Weintraub, R. N. Wensley, N. J. Whitney, W. G. Ziller.

Honorary membership in the Society was conferred upon Dr. J. H. Craigie, Chief, Division of Botany and Plant Pathology, Ottawa.

An honorarium of $20.00 for stenographic assistance received by the Secretary-Treasurer was voted on motion of A. J. Skolko, seconded by W. Newton.

The president outlined a proposal of the Canadian Agricultural Economics Society to have the Journal of the Agricultural Institute of Canada, "Scientific Agriculture", subdivided by subject matter and in the discussion that followed it was decided to await further advice from the A.I.C. as the matter is under consideration by them. It was suggested by T. Johnson that the Editorial Committee could handle this matter rather than set up a special committee. L. T. Richardson suggested that the matter be discussed by regional groups in the course of their meetings during the year.

J. W. Groves informed the meeting that he had been requested by the chairman of the Canadian Committee on Culture Collections of Micro-organisms to outline the functions of this committee. The committee was established in 1948 under the National Research Council and in 1951 published a directory of Canadian culture collections. Through the National Research Council grants are made available for research work on classification, taxonomy, and preservation of cultures of micro-organisms.

H. M. Good suggested that the Society might establish a collection of coloured transparencies of disease symptoms to be used more or less as types of which copies could be made available upon request, and that a committee be set up to initiate the collection. This suggestion was supported by L. W. Koch. It was indicated that a similar plan had been attempted in the United States but that the results were of doubtful value. H. R. McLarty pointed out the difficulties of securing such a collection from individual members and suggested that a list of coloured slides available for loan might be prepared. The matter was referred to Council for further consideration.

D. B. O. Savile requested that copies of Dr. J. W. Groves' paper on the International Rules of Botanical Nomenclature be distributed, possibly in mimeographed form and his motion to this effect was seconded by T. Johnson. Dr. Groves agreed to prepare the paper for distribution, and it was suggested that it could be printed as a number of the C.P.S. News.

A. N. Langford moved that at future meetings the length of time for presentation of papers be restricted and notice of this restriction be sent to the membership at the time that requests for papers to be presented is made. This motion was seconded by W. C. Broadfoot and carried.

The report of the Resolutions Committee was presented by J. F. Hockey and on his motion, seconded by L. W. Koch, was unanimously carried.

The retiring president then turned over the meeting to the new president, Dr. J. C. Perrault, who expressed his appreciation of the honour bestowed upon him. The following committee appointments and Regional group representatives were announced.

COMMITTEES

Nominating (by election): G. H. Berkeley (Chairman), W. Newton, A. N. Langford, H. M. Good, L. W. Koch.

Program and Publicity: B. J. Sallans (Chairman), R. J. Ledingham, T. C. Vanterpool, G. J. Green, A. J. Skolko.

Resolutions: R. C. Russell (Chairman), W. E. Sackston, L. E. Tyner.

Editorial: Ruth M. Horner (Chairman), M. F. Welsh, G. W. Ayers, A. J. Skolko.

Terminology: A. W. Henry (Chairman), D. C. Buckland, J. H. Craigie, W. A. F. Hagborg, D. L. Bailey, B. H. MacNeill, H. M. Good, R. S. Willison, R. A. Ludwig, W. E. McKeen, W. A. Hodgson, C. D. McKeen, A. N. Langford, R. Pomerleau, L. E. Tyner, M. F. Welsh, and T. C. Vanterpool. (Additional members may be appointed at the discretion of the chairman).

Nomenclature: W. J. Cherewick (Chairman), I. L. Conners, J. W. Groves, J. J. Miller, W. L. Gordon. (Additional members may be appointed at the discretion of the chairman).

Disease Diagnosis: W. Newton (Chairman), W. E. Sackston, H. W. Mead, G. B. Sanford, G. C. Chamberlain, D. J. MacLeod, Frances C. Mellor, and W. G. Benedict.

Custodian of Library and Records: T. Johnson.

Auditors: Mildred K. Nobles and J. W. Groves.

Representative to the Canadian Society of Microbiologists: A. R. Walker.

Publications: W. F. Hanna (Chairman), F. L. Drayton, G. H. Berkeley.

Regional Representatives:

L. C. Callbeck	—	Maritimes
R. Pomerleau	—	Eastern Quebec
L. Cinq-Mars	—	Western Quebec
R. J. Baylis	—	Eastern Ontario
J. J. Miller	—	Western Ontario
W. A. F. Hagborg	—	Manitoba
T. C. Vanterpool	—	Saskatchewan
A. W. Henry	—	Alberta
I. C. MacSwan	—	B.C. Mainland
R. E. Foster	—	Vancouver Island

The meeting was then adjourned.

Among the highlights of the annual meeting was a dinner of the C.P.S. on June 23 in the Quebec Suite of the Chateau Laurier. The guest speaker was Dr. W. F. Darke, Agricultural Adviser to the United Kingdom High Commissioner.

An invitation paper, "The current approach in the toxicological evaluation of insecticides and fungicides", by Kingsley Kay and W. L. Ball, Department of National Health and Welfare, was presented by Dr. Ball and an abstract of this paper appears below.

REPORT OF THE SECRETARY-TREASURER

Mr. President and Fellow Members:

I have the honour of presenting the following brief report of the Secretary-Treasurer for the fiscal year ending May 31, 1952.

The annual meeting of the Society, held in Winnipeg, June 25-28, 1951, was reported in Proceedings No. 19 which was issued Jan. 31, 1952. That the Society is enjoying steady progress is indicated by the increased size of the report necessary to cover the proceedings (and incidentally by the increased cost of publication).

The B.C. Mainland Regional Group, Vancouver, and the Eastern Ontario Regional Group, Ottawa, held regular meetings during the year. Brief accounts of these meetings were reported in the C.P.S. News. The News was distributed as three numbers of volume IV.

The membership of the Society reached a total of 175 and with 33 applications on hand may reach a total of 200 for next year. However, 50 members are still in arrears of fees. The death of Miss Constance McKeen and more recently of Dr. H. S. Jackson represents a great loss to the Society.

Dr. John Dearness, an honorary member of the Society, celebrated his 100th birthday on May 13, 1952, and a telegram of congratulations was sent on behalf of the Society.

Attached is a financial statement as of May 31, 1951, showing a favourable balance of $239.27 as compared with a balance of $361.09 for last year. This reduction can be attributed to decreased revenue from fees, in spite of an increased membership, increased charges for printing of the proceedings, for stationery, and annual meeting expenses.

Respectfully submitted,

A. J. SKOLKO,
Secretary-Treasurer.

FINANCIAL STATEMENT
CANADIAN PHYTOPATHOLOGICAL SOCIETY

June 1, 1951 to May 31, 1952

Revenue:

Balance brought forward			$361.09
Fees:			
1950-51	$ 24.00		
1951-52	203.00		
1952-53	46.00		
		$273.00	
Interest on bond		22.50	
Sale of Proceedings		3.98	
Refund on annual meeting expenses		10.00	
			$309.48
			$670.57

Expenditures:

Printing of Proceedings No. 19	$210.10	
Honorarium for stenographic assistance	20.00	
Postage	35.25	
Stationery	77.00	
Expenses re annual meeting	86.98	
Bank charges and exchange	1.97	
		$431.30
Balance (on hand) May 31, 1952		$239.27
Additional Asset:		
Dominion of Canada 3% Victory Bond (Series K8Z32643)		$500.00

Audited and found correct,

(Signed) M. K. NOBLES

J. WALTON GROVES

REPORT OF THE CUSTODIAN OF THE LIBRARY AND RECORDS OF THE SOCIETY

Accessions to the library during the year 1951-52 are composed of 80 items, mostly reprints of scientific papers, including also the Yearbook of the Royal Veterinary and Agricultural College, Copenhagen, Denmark, and the Annales de l'Institut National de la Recherche Agronomique (Ser. C. Epiphyties), Paris.

This year's accessions, which have been indexed, bring the number of items in the library to 516.

T. JOHNSON.

REPORT OF THE EDITORIAL COMMITTEE

The Proceedings of the Eighteenth Session of the Canadian Phytopathological Society were issued on January 31, 1952. They contain the report of the meeting held at Winnipeg, Man., June 25-28, 1951, and a group photograph of those attending, twenty-three abstracts of papers read at the meeting, a list of papers published by members of the Society between June 1, 1950, and May 31, 1951, and obituary notices for Professor H. S. Jackson and Miss Constance G. McKeen.

The work of the Secretary-Treasurer in preparing the material for the Proceedings is to be highly commended.

H. R. McLARTY
L. C. CALLBECK
A. J. SKOLKO
J. W. GROVES (Chairman)

REPORT OF THE NOMINATING COMMITTEE FOR 1951-52

The slate of officers as approved by the nominating committee of the C.P.S. is as follows:

President	Dr. J. C. Perrault
Vice-President	Dr. P. M. Simmonds
Secretary-Treasurer	Dr. A. J. Skolko
Councillors	Mr. W. R. Foster
	Dr. G. H. Berkeley

Respectfully submitted,

D. J. MacLeod
W. C. Broadfoot
L. W. Koch
T. C. Vanterpool
Wm. Newton (Chairman)

REPORT OF THE TERMINOLOGY COMMITTEE OF THE C.P.S.

Survey work of twelve sections of the field of Plant Pathology was continued by members of the Terminology Committee during the past year. It was found that in most of these, considerable revision is needed but that in a few, present usage is reasonably satisfactory.

The Committee, following a suggestion made by the President, supported a plan to devote some time at regional group meetings of the C.P.S. to the discussion of terminology problem. Such discussions were held by several groups and considerable interest was thereby stimulated in the improvement and standardization of the terminology of Plant Pathology. Another result was that the Terminology Committee received some valuable suggestions in the reports of these regional meetings.

Since the work of the Committee is progressing more rapidly in some directions than in others, it would appear desirable to prepare sectional summaries as they are completed, and to circulate these separately to members of the society for their comments. Some of these will be available for distribution during the coming year.

Respectfully submitted,

D. C. Buckland
J. H. Craigie
W. A. F. Hagborg
D. L. Bailey
B. H. MacNeill
H. M. Good
R. S. Willison
R. A. Ludwig
W. E. McKeen
W. A. Hodgson
C. D. McKeen
R. Pomerleau
L. E. Tyner
M. F. Welsh
T. C. Vanterpool
A. W. Henry (Chairman)

REPORT OF THE C.P.S. COMMITTEE ON PLANT DISEASE DIAGNOSIS

1. The appointment of larger numbers of pathologists is essential to create an adequate diagnostic service, owing to the huge areas in forest and agricultural crops that should be covered by systematic plant disease surveys. The inadequacy of the numbers of pathologists in training at Canadian Universities, the necessity of attracting greater numbers to the profession, and the responsibility of the Canadian government in this regard, are stressed.

2. The final responsibility for diagnosis is becoming more and more dependent upon "specialists," owing to the growing importance of "races" or "forms" of plant disease; therefore, diagnostic organizations should radiate outwards from the "specialist" or "group of specialists" to the "field" or "non-specialists."

3. Diagnostic studies of virus disease are now confined largely to special crop areas and no provision exists for the diagnosis of disease outside these areas. The establishment of a station where any domestic or foreign virus disease can be identified is recommended and, owing to the frequent establishment of trade restrictions against both virus and nematode diseases the function of such a station might be broadened to serve also as a centre for the diagnosis of any domestic or foreign nematode disease.

4. The responsibility is stressed that rests upon the "specialist" of drawing the attention of C.P.S. members through "C.P.S. Notes" to handbooks, favourable test plants, and other diagnostic aids.

5. The preparation of "Check Lists" covering specific geographical areas is stressed as an aid in diagnostic studies to pathologists and agriculturists, especially when the check list includes brief descriptions of key diagnostic features.

6. Training in the recognition of foreign plant disease is accepted as a normal as well as a civilian defence measure.

7. Diagnostic services might be improved if the mycologists listed periodically in "C.P.S. Notes" the names and addresses of the specialists upon the various genera, with notes as to who are eager to receive specimens. There is also a belief that the modern trend in mycology towards the classification of fungi by physiological means is likely to serve the needs of pathologists better than classification based upon morphology only.

Respectfully submitted,

W. F. Hanna
P. M. Simmonds
G. B. Sanford
M. F. Welsh
J. D. Gilpatrick
R. E. Fitzpatrick
L. W. Koch
W. Newton (Chairman)

REPORT OF THE SMUT NOMENCLATURE COMMITTEE OF THE C.P.S.

Shortly after this committee was set up at the C.P.S. meeting in 1951, the chairman found that some smut investigators in Canada and the United States did not favour Fischer's reclassification of smut fungi. A circular letter was then drafted and sent to a number of plant pathologists and mycologists in Canada, England and the United States. This letter contained three alternative suggestions, (a) retaining the nomenclature as amended by Stevenson and Johnson, Pl. Dis. Rep. 23: 263. 1944; (b) adopting Fischer's reclassification and nomenclature in which, for example, covered smuts of oats and barley would be combined under *Ustilago hordei*, loose smut of oats and the false loose smut of barley under *U. avenae*, etc.; or (c) adopting Fischer's reclassification but under different names, e.g., *U. segetum, U. tecta*, etc.

Replies to the circular letter clearly indicate that, at least for the time being, nomenclature of cereal smuts as amended by Stevenson and Johnson and presently used in Canada and the United States is favoured. A few replies were in favour of reclassification but under different names than those used by Fischer. A few others indicated that Fischer's choice of names was probably correct, according to the International rules of nomenclature, but they did not favour the reclassification. The

majority of the replies, however, stated that Fischer's nomenclature would lead to confusion and, therefore, they were not in favour of following it.

Respectfully submitted

I. L. Conners
J. W. Groves
J. J. Miller
W. L. Gordon
W. J. Cherewick (Chairman)

REPORT OF THE REPRESENTATIVE TO THE CANADIAN SOCIETY OF MICROBIOLOGISTS

The Second Annual Meeting of the Canadian Society of Microbiologists was held at Montreal, June 5-7, 1952. The hosts were the University of Montreal and McGill University. Registration was about 190. Some 30 scientific papers were presented and discussed.

Thursday night the delegates and their friends were guests of the Mayor and City of Montreal at a buffet dinner. Friday night a dinner was given by the University of Montreal.

Several important items were considered at the Council meeting and at the general business meeting. I have not received the complete minutes from the secretary as yet but will mention a few of the more important items.

It was decided to accept the invitation of the Ontario Agricultural College to hold the next annual meeting in Guelph early in June 1953.

It was decided to send two representatives to the International Congress of Microbiologists in Rome. Some other members intimated they intended to go to the meetings at Rome supported by funds from their employing organization. These and any other planning to attend were requested to communicate their intention to the Secretary, Dr. N. E. Gibbons, Division of Applied Biology, National Research Council, Ottawa, Ontario, so that their names might be forwarded as official delegates of the Canadian Society.

The incorporation of the society was considered but it was decided to leave this important step until the constitution became well established.

The present constitution imposes no financial obligation on any society which affiliates with it. The executive and council plan to keep the financial obligations low enough that they may be met by a moderate registration fee of those attending the annual meetings.

Respectfully submitted,

A. R. Walker.

REPORT OF RESOLUTIONS COMMITTEE

Whereas the Canadian Phytopathological Society has held its 19th Session at Ottawa, June 23-26, 1952, in conjunction with the Annual Convention of the Agricultural Institute of Canada, and whereas the accommodations and facilities placed at the disposal of the Society have contributed notably to the success of the sessions;

Be it resolved we extend our sincere appreciation to:

(1) Our hosts, the Eastern Ontario Branch of the Agricultural Institute of Canada.

(2) Mr. R. J. Baylis, Chairman, Program and Publicity Committee and members of his committee, for preparing the program and making arrangements for the annual dinner.

(3) Drs. Kingsley Kay and W. L. Ball for their invitation paper on the toxicological evaluation of pesticides.

(4) Messrs. Dow Chemical Company, Green Cross Insecticides, Niagara Brand Spray Company and Canadian Industries Limited for the reception at our Annual Dinner.

Respectfully submitted,

J. L. Howatt
R. O. Lachance
L. W. Koch
J. F. Hockey (Chairman)

ABSTRACTS OF PAPERS PRESENTED AT THE NINETEENTH MEETING OF CANADIAN PHYTOPATHOLOGICAL SOCIETY

POTATO SEEDLINGS HYPERSENSITIVE TOARDS SOLANWUM VIRUS I, SMITH (POTATO VIRUS X), AND A RAPID MEANS OF DETECTING THE REACTION

R. H. BAGNALL, Canada Department of Agriculture, Fredericton, New Brunswick.

The susceptibility of the new varieties Keswick and Canso to potato virus X had been forseen and breeding of seedlings possessing either immunity or the hypersensitive form of resistance towards this virus had been commenced in the spring of 1950. The immune parent was U.S.D.A. Seedling 41956, and the hypersensitive parents were the British variety Epicure and certain Scottish seedlings. These were crossed with pollen from American seedlings resistant to late blight.

Preliminary tests showed that attempts to detect the hypersensitive reaction by inoculating the seedlings with sap containing virus X frequently resulted in destruction of the most desired seedlings by top necrosis. The inoculation of cuttings grown in "Vermiculite" proved to be a successful means of detecting the reaction while the original plants formed new shoots and were permitted to tuberize.

VARIATION IN ASCOCHYTA PISI LIB.

DONALD BREWER, Department of Botany, Ontario Agricultural College, Guelph, Ontario.

Inoculation studies with isolates of *Ascochyta pisi, the* causal organism of leaf and pod spot of peas, indicate the presence of races which differ in their pathogenicity. The most distinct difference occurs between the two groups isolated from pea and vetch. Cultural studies show that the various insolates fall into related groups upon the basis of their growth habit and developmental rhythm. For the most part these cultural relationships may be equated with pathogenic behaviour on differential hosts. Concomitant cytological investigations indicate that the variants of *A. pisi* probably have arisen through mutation.

SOME NOTES ON THE OBSERVATION OF PLANT DISEASES

I. L. CONNERS, Division of Botany and Plant Pathology, Science Service Building, Department of Agriculture, Ottawa, Canada.

Methods for the accurate estimate of disease intensity have been developed and by appropriate experiments the relation between loss and disease intensity have been determined for diseases such as the rusts and smuts of cereals. A few examples of the accomplishments to date were illustrated. However, it was pointed out that little was known about the damage caused by important diseases of vegetables. For example, an excellent scale had been devised by British plant pathologists to estimate

the intensity of late blight in potatoes, but this scale appears never to have been tried out in Canada. Available data indicate that when potatoes are sprayed with Bordeaux, the marketable yield is substantially increased. Besides the prevention of tuber rot, not all the increase in yield can be attributed to control of the disease. This assumption seems reasonable because of improved yield in the virtual absence of disease and the still higher yields obtained from plots sprayed with Dithane D-14 plus zinc sulphate.

A plea was made to the society to appoint a committee to work with the head of the Plant Disease Survey to improve the present survey.

ROOT DISEASES OF SUGAR BEETS IN ALBERTA

M. W. CORMACK and F. R. HARPER, Laboratory of Plant Pathology, Lethbridge, Alberta.

Seedling blight or black root of sugar beets is widespread in the irrigated districts of southern Alberta. It has been found in the first inspection of every field examined during the past four years. The damage has been slight, except in 1949, when the weather was relatively warm and wet during May. *Phoma betae* has predominated among the isolates from diseased seedlings each year, and has caused more post-emergence damage than other fungi isolated. *Pythium ultimum* and *Aphanomyces cochlioides* have occurred mainly in wet seasons and in low areas. *P. ultimum* caused severe pre-emergence damage in greenhouse infection tests. *Rhizoctonia solani* and *Fusarium* spp. appear to be of minor importance.

Root rot of mature beets occurred commonly only in 1949, when moderate to severe damage was found in 32 per cent of the fields examined. There was very little development or spread of the disease in the storage piles. *Phoma betae* was the most virulent of the fungi isolated from diseased beets. High humidity during storage decreased the damage caused by *P. betae,* but favoured infection by *Pythium ultimum.* Wilted beets, and those stored for long periods, were markedly predisposed to infection by these fungi.

EVIDENCE OF FUNGOUS SUCCESSIONS IN DECAYS OF SUGAR MAPLE

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Corticium vellereum Ell. & Crag. has been frequently isolated from decaying sugar maples in Ontario, usually from a dark buff decay showing a gradual transition from punky wood to a wide band of deep brown wound gum wood. Occasionally, however, black zone lines were found or a white or yellow decay quite distinct from the usual type. A number of samples from which only *C. vellereum* was isolated but which did not show the expected type of rot, showed, on sectioning the presence of other fungi which had apparently been suppressed completely by *C. vellereum.* In some cases the nature of the hyphae and the decay pattern have permitted a tentative identification of the primary invader. These observations suggested that isolation methods alone may be insufficient to diagnose the causal organism of decays and that histological study is advisable when a new decay is being described.

SEXUAL PHENOMENA RELATED TO THE PRODUCTION OF PERITHECIA IN CERTAIN SPECIES OF FUSARIUM

W. L. GORDON, Laboratory of Plant Pathology, Winnipeg, Manitoba.

Since 1947, a total of six species of *Fusarium,* classified in five sections of the genus, have been induced to form fertile perithecia on potato sucrose agar and on other sterile media when kept in the laboratory or greenhouse. *Fusarium moniliforme* Sheldon *(Gibberella fujikuroi* (Saw.) Wr.), and *F. sambucinum* Fuckel f. 6 Wr. *(Gibberella cyanogena* (Desm.) Sacc.) proved to be bisexual (hermaphroditic), intra-sterile and inter-fertile. In these self-sterile species, single-ascospore or

monoconidial cultures form protoperithecia which only develop into fertile perithecia after fertilization by a culture of the opposite mating type. *Fusarium graminearum* Schwabe *(Gibberella zeae* (Schw.) Petch), *F. decemcellulare* Brick *(Calonectria rigidiuscula* (Berk. & Brme.) Sacc.), *F. nivale* (Fr.) Ces. *(Calonectria nivalis* Schaffnit), and an isolate of *F. solani* (Mart.) App. & Wr. emend. Snyder & Hansen *(Hypomyces solani* Rke. & Berth. emend. Snyder & Hansen) were found to be bisexual (hermaphroditic) and self-fertile.

The ability of different cultural strains of the self-sterile species to form protoperithecia, and of the self-fertile species to form perithecia, differed widely.

THE INTERNATIONAL RULES OF BOTANICAL NOMENCLATURE

J. WALTON GROVES, Division of Bontany and Plant Pathology, Science Service Building, Department of Agriculture, Ottawa, Canada.

This is a report on the sessions of the nomenclature section of the VII International Botanical Congress, Stockholm, 1950. A discussion will be presented of some of the more important points raised and changes made in the Rules, especially as they affect mycological nomenclature.

STUDIES ON STEM CANKER AND POD AND STEM BLIGHT OF SOYBEANS IN ONTARIO CAUSED BY DIAPORTHE SPECIES

A. A. HILDEBRAND, Laboratory of Plant Pathology, Harrow, Ontario.

Stem Canker

In late July soybean plants in southwestern Ontario begin to show well-defined, reddish-brown lesions which occur low on the stem usually at a leaf scar or at the juncture of a lateral branch with the main stem. As the season advances the number of infected plants increases and the lesions become more conspicuous both as to colour and size. At points of infection stem tissues become dry and brittle, translocation is stopped, and plants die as if from drought. Transfers of infected tissue to standard laboratory media yield almost invariably pure cultures of a *Diaporthe* species. Monoascosporic cultures of the 19 isolates obtained to date are not all identical morphologically but all give rise directly to the perfect stage of the fungus, the perithecia being produced, in culture as in nature on overwintered stems, in characteristic caespitose groups. In the field, varieties appear to differ appreciably in susceptibility, Blackhawk and Hawkeye, for example, being conspicuously more susceptible than Harman; but greenhouse pathogenicity trials involving the planting of seed of these varieties in artificially-infested soil, reveal that Harman is as highly susceptible to certain of the isolates as either Blackhawk or Hawkeye. Such tests indicate also that isolates differ as to their pathogenic capabilities. Evidence to date strongly suggests that the pathogen is indigenous to the soil of southwestern Ontario, that it has built up rapidly following the recent wide-spread planting of the highly susceptible varieties Blackhawk and Hawkeye, and that seed transmission is not the most important mode of dissemination of the disease under field conditions. The disease which is currently the most serious threat to the successful production of soybeans in Ontario, is known as stem canker and *Diaporthe phaseolorum* var. *batatatis* (Harter and Field) Wehm., has been regarded as the causal organism. It is understood, however, that an investigator in the United States will shortly designate the pathogen as a new species of *Diaporthe*.

Pod and Stem Blight

Towards the end of the season when plants are approaching maturity, stems, petioles, or pods may show aggregations of minute, black bodies which are either pycnidia or the stromatal precursors of pycnidia and which, on stems especially, tend to be arranged in linear rows. From these bodies which are symptomatological of the disease known as pod and stem blight, have been obtained to date eleven isolates of *Phomopsis* not all of which are identical morphologically or pathogenically.

These pycnidial isolates were considered as possibly representing the imperfect stage of *Diaporthe phaseolorum* (Cke. and Ell.) Sacc. var. *sojae* (Lehm.) Wehm., but all attempts to induce them to form the perfect stage of that or any other fungus have so far been unsuccessful; nor, indeed, has the perfect stage of *D. phaseolorum* var *sojae*, which in contrast to the stem canker organism produces its perithecia singly, yet been found in nature in Ontario.

OBSERVATIONS ON A ROOT AND STEM ROT OF SOYBEANS NEW TO ONTARIO CAUSED BY PYTHIUM ULTIMUM THROW

A. A. HILDEBRAND and L. W. KOCH, Laboratory of Plant Pathology, Harrow, Ontario.

In early July, 1951, a stem and root rot affecting a number of varieties of soybeans was found almost simultaneously in Essex and Kent counties in southwestern Ontario. Affected plants, occurring singly or in small groups, are dwarfed and show first a wilted, then a necrotic, brown, dried-out condition. The causal organism was identified as *Pythium ultimum* Trow which heretofore has not been reported as pathogenic to the soybean. The disease is favoured by low soil temperature, although, in heavily-infested soils, the fungus is capable of destroying seed over a relatively wide range of soil temperatures.

MYCOLOGICAL INVESTIGATIONS OF BIRCH IN ONTARIO

RUTH M. HORNER, Division of Botany and Plant Pathology, Science Service Building, Department of Agriculture, Ottawa, Canada.

A detailed survey of the twig inhabiting fungi of *Betula lutea* Michx. f. and *Betula papyrifera* Marsh. showing symptoms of early stages of deterioration in Ontario was carried out during the field seasons 1949 to 1951. The purpose of this survey was to determine whether or not a fungus occurred consistently enough in dying shoots and branches to be a possible cause of deterioration.

The mycological picture was found to be quite different for the two host species studied. A fungus identified as *Phomopsis* sp. has been isolated consistently from dying shoots and definite disease lesions on branches of *Betula lutea* throughout its commercial range in Ontario. No definite disease lesions which could be attributed to a fungus were found common to all *Betula papyrifera* sampled. A fungus identified as *Melanconium bicolor* Nees ex Fr. has been isolated fairly consistently from the latter host from dying shoots showing injury due to an insect, the birch shoot borer, *Epinotia solicitana* Walker.

Pathogenicity tests carried out in greenhouse and nursery, using the above two fungi on their respective hosts, indicate that they do not possess a degree of virulence sufficient to warrant their consideration as a primary cause of the deterioration of birch, but are thought to hasten the death of tree severely weakened in some way.

PRELIMINARY REPORT ON THE OCCURRENCE OF PHYSIOLOGICAL RACES OF PHYTOPHTHORA INFESTANS (MONT.) DE BY IN EASTERN CANADA

J. L. HOWATT and W. A. HODGSON, Laboratory of Plant Pathology, Fredericton, New Brunswick.

During the summer of 1951, a number of fields of Keswick and Canso potatoes in the Maritime Provinces were severely attacked by *Phytophthora infestans* (Mont.) De By. As these two varieties had not previously been attacked by this fungus in the field, isolations were made to determine if a physiological race of the fungus had made its appearance. The results of tests conducted to determine the pathogenicity of these isolates to a group of resistant varieties and seedlings, indicated that there are at least six physiological races of the fungus present in Eastern Canada

A PRACTICAL APPROACH TO THE TOXICOLOGICAL EVALUATION OF INSECTICIDES AND FUNGICIDES

KINGSLEY KAY and W. L. BALL, Industrial Health Laboratory, Department of National Health and Welfare, Ottawa, Ont.

The new organic insecticides developed since the war are creating serious hazards to the health of growers applying the materials. One insecticide in wide use has been developed from compounds which were manufactured by the Germans to be used as a war gas. One known fatality among Canadian sprayers has already occurred.

The Department of National Health and Welfare has undertaken detailed study of the problem and investigation of the amount of various insecticides and fungicides in the air breathed by sprayers is being carried out. Tests of the effect of sprays on the blood of exposed persons are being conducted. Scientific and clinical study by the Department of National Health and Welfare is being carried on in co-operation with the Science Service of the Department of Agriculture and the Quebec government.

New and deadlier chemicals are being constantly developed. It has not yet been possible to find a powerful insecticide that is not also very poisonous to man.

The health hazard from pesticides depends not only on the toxicity of their active ingredients but also on the effect of the specific formulation and the manner in which it is applied.

The emulsifiers and oils used in formulating, by altering the concentration in which a toxicant reaches a critical centre in the organism attacked, may increase or decrease its toxicity.

The solvent employed, by altering the physical form of the particles dispersed in the air or on surfaces, may influence the toxicity.

The particle size of a formulation will govern its rate of settling and penetration into the lungs. These two factors may have a marked effect on the hazard.

The work of this laboratory has been directed toward assessing the mammalian toxicity of specific pesticidal formulations and the correlation of their physiological effect on humans with exposures encountered in the field.

Based on theoretical considerations and our observations we believe that each specific formulation should be evaluated against a standard, for the laboratory toxicity of the pure toxicant and the hazard of a formulation thereof may show little correlation. It is vitally important that more field surveys be made if a true assessment of the hazards of the various methods of applying pesticides is to be obtained.

A BLACK ROT DISEASE OF GREENHOUSE CUCUMBERS IN SOUTHWESTERN ONTARIO

C. D. McKEEN, Laboratory of Plant Pathology, Harrow, Ontario.

In 1950 a serious outbreak of fruit rot and stem canker of cucumbers occurred in a single large greenhouse at Leamington, Ontario. Lesions developing at the nodes girdled the stems, ultimately causing wilt and death of many plants. Senescent and moribund tissue was found to serve as an infection court for the causal fungus prior to its invasion of healthy fruit and stem tissue. Pycnidia of the *Phomopsis* type were produced in abundance on most lesions and occasionally were found to contain Beta conidia in addition to the more prevalent Alpha conidia. In 2—or 3—month old cultures, on steamed cucumber stems, derived from single pycnidiospores, Beta conidia were occasionally found to be the predominant spore type in many pycnidia. Perithecia were observed on naturally infected stems only rarely, and in those instances were found in proximity to but not interspersed among the

pycnidia. To date, cultural studies have failed to reveal a connection between the perithecial and pycnidial forms. So far as general disease symptoms and the type of parasitism displayed is concerned, the causal fungus shows striking similarities to the black rot fungus, *Mycosphaerella melonis* (Pass) Chiu and J. C. Walker, commonly reported to attack watermelons and other cucurbits. Nevertheless, on the basis of certain morphological differences the former fungus would appear to be a previously undescribed pathogen of cucumbers.

TOBACCO ETCH ON PEPPERS IN SOUTHWESTERN ONTARIO

C. D. McKEEN, Laboratory of Plant Pathology, Harrow, Ontario.

During the summers of 1950 and 1951 a destructive disease occurred in many fields of sweet peppers in southwestern Ontario. In late July and early August prominent symptoms consisted of concentric ring patterns on both foliage and fruits. Necrosis was often associated with ring patterns. Fruits on infected plants were frequently misshapen, with an irregular surface and shrivelled on one side. Later in the season young leaves on infected plants were distorted, rugose, chlorotic and often showed appreciable dark green blotching and vein-banding. Yellowed leaves on old diseased plants usually showed retention of chlorophyll in the form of rings and wavy bands. Other symptoms included drooping of leaves, necrosis of roots and pronounced stunting of growth. When tobacco and other differential hosts were inoculated, using expressed juice from diseased peppers, symptoms characteristic of the tobacco etch virus developed in many instances. Other tests disclosed that strains of cucumber mosaic occurred frequently in combination with tobacco etch in diseased peppers. Likewise, although less frequently, tobacco mosaic occurred along with tobacco etch. Greenhouse inoculations of California Wonder, Pennwonder and Pimiento varieties of sweet peppers with several isolates of etch obtained from diseased peppers and tobacco in Ontario have produced the symptoms outlined above. Similar symptoms have been produced by a strain of severe etch obtained from tobacco in Kentucky.

A STUDY OF THE DISTRIBUTION OF FUSARIUM WILT OF MUSKMELONS AND WATER-MELONS IN SOUTHWESTERN ONTARIO

J. J. MILLER, Department of Botany, McMaster University, Hamilton, Ontario.

Both diseases were found to be widely distributed in the melon-growing areas of southern Ontario. Some isolates of the pathogens were more virulent to seedlings than others and a number of morphological strains were detected by cultural comparisons. At Aldershot a field of the resistant muskmelon variety Iroquois was severely wilted, indicating that new pathogenic strains of this organism are appearing. One morphological strain of the muskmelon pathogen was very abundant, comprising 3/5 of the isolates, but the watermelon pathogen differed in that, on the whole, no one strain predominated. Greenhouse infection studies have confirmed the observations of McKeen that isolates from muskmelon and watermelon may attack either host in the seedling stage. In addition, a *Fusarium* isolated from cucumber was found to attack muskmelon and watermelon seedlings.

SOME EXPERIMENTS ON THE STIMULATION OF SPORULATION IN TRICHODERMA LIGNORUM BY RADIATION

J. J. MILLER, N. S. WEBB, and J. REID, Department of Botany, McMaster University, Hamilton, Ontario.

The effect of light on conidia formation in an isolate of *Trichoderma lignorum* from soil was studied. Although few conidia developed in cultures grown in the dark, brief exposure to light from a 25-watt incandescent lamp caused profuse sporulation. Repeated experiments gave somewhat varying results but on the average an exposure of about 1 minute to light of 1 candle-power intensity sufficed to induce sporulation. The violet and blue wave lengths from a mercury lamp were much

more effective than the green, and the yellow had no effect. Further experiments with incandescent lamps as light sources indicated that yellow and red were non-stimulating. Exposure to X-rays for varying periods of time did not stimulate sporulation.

THE PRODUCTION OF THIAMIN BY CERCOSPORA CRUENTA SACC.

S. H. ZAMIN NAQVI, Division of Plant Pathology, Department of Plant Protection, Ministry of Food and Agriculture, Karachi, Pakistan.

Ceroospora cruenta Sacc., the causal organism of a leaf spot of *Vigna catjang* Endl., was investigated with respect to (1) its ability to synthesize thiamin, (2) the presence of thiamin in its mycelium, and (3) possible release of thiamin from the mycelium into the medium.

Phytophthora erythroseptica Peth., which requires thiamin for its growth but does not synthesize it, was employed as the test fungus. After *C. cruenta* had grown on a vitamin free liquid medium for 50 days at 25° C., the mycelial growth was separated from the staled medium. The mycelium and the medium were then inoculated separately with the test fungus. It was observed that *P. erythroseptica* showed appreciably more growth on the mycelium of *C. cruenta* than on the staled medium.

These results indicate that thiamin is synthesized by *C. cruenta*, stored in its mycelium, and not released to any appreciable extent into the medium.

THE NUTRITION OF PHYTOPHTHORA SPP.

W. NEWTON and L. E. LOPATECKI, Laboratory of Plant Pathology, Saanichton, B.C.

The growth of four *Phytophthora* spp. is supported by inorganic nitrogen, *P. cactorum* by NH4+ but not by NO3, *P. megasperma* by NO3—but not by NH4+ NH4+ NO3 NO3—NH4+ and *P. parasitica* and P. *erythroseptica* by NH4+ and NO3—but better by NO3—. Growth of all species was better supported by organic nitrogen, asparagin and dl-alanine. Evidence is presented that Ca, Fe, Zn, Cu, Mn and an unknown micro element in tap water are required by these species with the possible exception of Ca in the nutrition of *P. cactorum*. The optimum glucose or sucrose concentration for all species is close to 4%. The growth of *P. cactorum* is not depressed to the same extent by increasing the sucrose content of the medium from 4 to 7 or 10% apparently due to the secretion of less invertase by this species than by the others. The coefficient of sugar utilization is independent of sugar and thiamin concentration. In a nutrient solution, containing all known nutrients, the growth of *P. parasitica* becomes progressively greater as the dl-alanine content is raised from 0.2 to 1% and the thiamin content from 0.2 mg. to 0.8 mg. per litre. *P. parasitica* has promise in the bio-assay of thiamin due to the straight line relationship between growth and thiamin concentration in a medium that contains 1% dl-alanine.

STRAWBERRY GANGRENE

A. PAYETTE, Laboratory of Plant Pathology, Ste. Anne de la Pocatiere, Quebec.

Strawberry gangrene is a progressive necrosis characterized by indefinite, invading lesions, brown or black in colour, on any part of the plant.

Fungi typified by *Botrytis cinerea* Pers. and *Rhizoctonia solani* Kühn appeared to be the main agents of strawberry gangrene in Quebec.

The frequency of organisms isolated from infected tissues was not correlated with pathogenicity.

Wind, insects, nematodes, mites, overwintering, weather and soil conditions, cultural practices, and other fungi could influence the disease to some extent.

Roots were more easily infected in sand than in compost.

Strains of streptomycetes appeared antagonistic to *Botrytis* sp. of the *cinerea* type and to *Rhizoctonia* sp. of the *solani* type.

Copper oxychloride (COCS), fermate and dithane D-14 could check the disease to a certain extent.

It was possible to reproduce, on sand, in the greenhouse, typical *Rhizoctonia* and *Botrytis* gangrene with symptoms and signs on every part of the plants, while the checks remained healthy.

It should then be easy to determine, according to this method, which organisms are primarily responsible for such diseases in the field.

BIOASSAY BY THE PAPER-DISK PLATE METHOD

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The paper-disk plate method with *Glomerella cingulata* as the test organism (as developed by Leben and Keitt for the assay of thiram) was employed in a study of certain fungicides which do not show straight line dosage-response curves when assayed by the usual spore germination method. Blotting-paper disks saturated with a fungicide at several dilutions were laid on the surface of solid peptone agar, the upper layer of which had been seeded with spores of the test organism. After incubation for 24 hours at 28° C., clear zones around the disks indicated the fungistatic activity of the chemical. The extent of its fungicidal action could also be demonstrated by incubating the plates for a week longer and observing the zones where no growth had occurred.

When the diameters of the initial zones of inhibition were plotted against the logarithms of the concentrations, normal curves were obtained with thiram at dilutions from 20 to 1.25 p.p.m., with ziram from 100 to 1.0 p.p.m. The fungicide Vancide and its components, sodium dimethyl dithiocarbamate and sodium mercaptobenzothiozole, were assayed singly and in combination. The first component produced measurable zones with a linear relationship over the range 10 to 0.1 p.p.m., and its inhibiting effect was in no way enhanced by the addition of sodium mercaptobenzothiozole which by itself showed no fungistatic action at 100 p.p.m.

It was found possible to increase the sensitivity of the method by adding a very small amount of the chemical being tested to each of the standard concentrations and comparing the curve obtained with the standard curve.

THE "DROWNING TREATMENT" FOR LOOSE SMUT OF BARLEY

R. C. RUSSELL, Laboratory of Plant Pathology, University of Saskatchewan, Saskatoon, Saskatchewan.

The results of several experiments were presented which showed that control of loose smut of barley was secured simply by soaking the infected seed in pure water in corked flasks. The infected seed was placed in Erlenmeyer flasks full of water. The flasks were then corked and kept at 70° F. for periods ranging from one to four days. Seed soaked for the longer periods did not germinate well but produced smut-free plants.

It is suggested that anaerobic respiration, carried on by the seed under these conditions, may have resulted in the formation of by-products that killed the smut, or that bacterial growth may have exerted an anti-biotic influence on the causal fungus. The possibility of making practical use of this method of control is being explored.

A SPECIES OF ITERSONILIA PATHOGENIC ON SUNFLOWERS

W. E. SACKSTON, Laboratory of Plant Pathology, Winnipeg, Man.

A fungus with clamp connections at most of the septa, and producing hyaline asymmetric ballistospores from sterigmata on the mycelium, was isolated from lesioned cotyledons and hypocotyls of sunflower seedlings exposed in the greenhouse to field collections of sunflower leaves bearing telia of *Puccinia helianthi* Schw. The fungus was identified as *Itersonilia* sp., a genus of the Heterobasidiomycetes not previously recorded in Canada. The fungus as first isolated agreed more closely with the description of *I. perplexans* Derx than with *I. pyriformis* Nyland, the only other described member of the genus. Preliminary studies with the acetocarmine technique indicated that ballistospores and young hyphae of the fungus were binucleate, and that chlamydospores were uninucleate.

Lesions similar to those from which the fungus was isolated were produced on the cotyledons and hypocotyls of sunflower seedlings inoculated with pure cultures of the organism. Lesions developed most rapidly when the seedling tissues were wounded slightly by rubbing with fine carborundum power prior to inoculation, followed by incubation in moist chambers for 48 hours. In preliminary host-range studies the fungus was reisolated from inoculated leaves of corn, carrots, cucumbers, flax, and oats, in addition to sunflowers.

PIEBALD OR YELLOWBERRY IN HARD SPRING WHEAT

B. J. SALLANS and P. M. SIMMONDS, Laboratory of Plant Pathology, Saskatoon, Saskatchewan.

Observations were made in the course of greenhouse experiments on root diseases of cereals on factors which influence the development of piebald kernels or yellowberry (starchiness) in wheat. Infections of wheat plants with *Pythium arrhenomanes* Drechsl. almost completely suppressed the development of starchiness, which appeared in the uninoculated checks. Leaching the soil with water to remove a portion of the soluble nutrient materials, particularly nitrogen, when wheat was in the pre-flowering stages of development resulted in increased percentages of piebald kernels. High soil moisture levels or the use of potassium dihydrogen phosphate as a fertilizer also increased the starchy condition. On the other hand, the addition of nitrogen in the form of potassium nitrate to the soil greatly reduced the percentage of piebald kernels. The numerous environmental factors reported here and elsewhere in literature as causes of piebald or yellowberry in wheat are interpreted as reducing the quantity and possibly the quality of protein relative to the amount of carbohydrates in the kernel.

The use of some factors which favoured the development of piebald, such as leaching the soil, maintaining high soil moistures and the addition of potassium phosphate fertilizer to the soil, proved practicable in testing wheat varieties for susceptibility to piebald. It was found difficult to induce piebald in the varieties Garnet and Regent and somewhat less difficult in Thatcher. On the other hand, Mindum, Red Bobs and Marquis readily yielded piebald kernels under like conditions.

SHORT-SEASON ADAPTATIONS IN THE RUST FUNGI

D. B. O. SAVILE, Division of Botany and Plant Pathology, Science Service, Department of Agriculture, Ottawa, Canada.

The northern limit for heteroecious, self-sterile, long-cycled species of *Puccinia* and *Uromyces* is approximately tree line. Self-fertility and short-cycling enable many species to persist in the arctic on hosts of suitable habit. In *Chrysomyxa,* overwintering of dikaryotic mycelium in evergreen leaves permits simultaneous development of uredinia and telia, and also makes the rust independent of the aecial host. *Hyalopsora aspidiotus* overwinters both by amphispores and by mycelia in the aecial host, thereby producing aecia, uredinia and telia nearly simultaneously.

Melampsora epitea overwinters as a sytemic-perennial monokaryon in *Saxifraga* and as a dikaryon in *Salix* buds, as well as by telia, thus being able to survive even when the sexual part of the life cycle cannot be completed.

SEED-BORNE FUNGI OF PEAS

A. J. SKOLKO and J. W. GROVES, Division of Botany and Plant Pathology, Science Service, Department of Agriculture, Ottawa, Canada.

Since 1939, seed of all foundation vegetable and field crops grown in Canada have been subjected to laboratory examination for the presence of pathogenic fungi. For certain of these crops other statutory grades of seed have also been examined. The results of seed examination of peas during the period 1939-1950 inclusive are summarized.

Ninety-two species of fungi have been isolated from pea seed and identified. Many of these species are known to be saprophytic whereas the pathogenicity of others remains to be determined. Of the known pathogens the three species of *Ascochyta* are the most important. Of almost 5,000 seed samples examined, 51 percent were found to be infected with *Ascochyta* spp., 18 percent classified as heavily infected, i.e., with over 10 percent of the seeds in a sample infected. Seed from the province of Quebec and eastern Ontario were most heavily infected whereas seed from Alberta and British Columbia were relatively lightly infected. Of the three species of *Ascochyta* isolated from pea seed, *A. pisi* was by far the most commonly encountered.

A PRIMITIVE ASCOMYCETE CAUSING A WOOD DISCOLOURATION

DOREEN E. WELLS, Division of Botany and Plant Pathology, Science Service, Department of Agriculture, Ottawa, Canada.

A fungus belonging among the primitive Ascomycetes has been found occurring as a common saprophyte on wood, causing a superficial brown discolouration on sawn timber. Proliferating asci are produced in branched chains from the apex of an upright brown stalk. The asci contain four hat-shaped spores similar to those found in several other genera, e.g. *Ascoidea, Endomyces* and *Ceratostomella.*

The fungus is homothallic and grows rapidly on malt agar producing the perfect state almost simultaneously with the imperfect state. It will be necessary to erect a new genus for this fungus.

COMPARATIVE STUDIES OF STONE FRUIT VIRUSES ON HERBACEOUS HOSTS

R. S. WILLISON and M. WEINTRAUB, Laboratory of Plant Pathology, St. Catharines, Ontario.

A number of Prunus viruses have been transmitted by juice transfer to several cucurbit hosts. Such transmissions are made much more readily from young infected peach leaves than from cherry leaves of comparable age. The rate of loss of infectivity of inocula prepared from cucurbit tissue varied with the virus or stain of virus employed, with the temperature of storage, and with the source of inoculum, its age and the conditions under which it was grown. The aging effects were also modified by the presence in the cucurbits of a reversible inhibitory mechanism which varied in its effects on different viruses and strains. The thermal inactivation point of the several viruses appeared to lie between 55° and 60° C., but could be markedly varied by conditions obtaining during the growth of the plants used as sources of inoculum. The viruses belonging to the necrotic ring spot, cherry yellows and tatter leaf groups respectively exhibited optimum infectivity at different pH levels. There were some indications that the viruses causing cherry yellows, tatter leaf and green ring yellows may be complexes.

OBSERVATIONS AND INVESTIGATIONS OF MANGANESE DEFICIENCY IN TREE FRUITS IN BRITISH COLUMBIA

C. G. WOODBRIDGE and H. R. McLARTY, Laboratory of Plant Pathology, Summerland, B.C.

Symptoms of manganese deficiency of tree fruits are described and illustrated (kodachromes). These symptoms have been observed on 16 kinds of plants, and affected plants have been found in nine districts in the Okanagan. Symptom expression is consistently associated with low manganese content. (Analytical results presented in tables.) Control experiments indicate that the deficiency can be corrected by spraying affected plants with manganese sulphate.

NOTE—(The list of papers published by members of the Canadian Phytopathological Society during the past year could not be assembled in time for publication and will be included in the next issue of the Proceedings.)